Fig. 11 shows a process flow for detecting a standard noise code that can be used in the Fig. 10 embodiment.

Fig. 12 is an embodiment employing a plurality of detectors in accordance with another embodiment of the present invention.

Fig. 13 shows an embodiment of the present invention in which a pseudo-random noise frame is generated from an image.

Fig. 14 illustrates how statistics of a signal can be used in aid of decoding.

Fig. 15 shows how a signature signal can be preprocessed to increase its robustness in view of anticipated distortion, e.g. MPEG.

Figs. 16 and 17 show embodiments of the invention in which information about a file is detailed both in a header, and in the file itself.

Figs. 18-20 show details relating to embodiments of the present invention using rotationally symmetric patterns.

W. ~~Fig. 21~~ Figs. 21A & 21B shows how the invention can be practiced by encoding "bumps" rather than pixels.

Figs. 22-26 detail aspects of a security card according to one embodiment of the present invention.

Fig. 27 is a diagram, illustrating the aspect of the invention that provides a network linking method using information embedded in data objects that have inherent noise.

Detailed Description of Preferred Embodiment

In the following discussion of an illustrative embodiment, the words "signal" and "image" are used interchangeably to refer to both one, two, and even beyond two dimensions of digital signal. Examples will routinely switch back and forth between a one dimensional audio-type digital signal and a two dimensional image-type digital signal.

In order to fully describe the details of an illustrative embodiment of the invention, it is necessary first to describe the basic properties of a digital signal. Fig. 1 shows a classic representation of a one dimensional digital signal. The x-axis defines the index numbers of sequence of digital "samples," and the y-axis is the instantaneous value of the signal at that sample, being constrained to exist only at a finite number of levels defined as the "binary depth" of a digital sample. The example depicted in Fig. 1 has the value of 2 to the fourth power, or "4 bits," giving 16 allowed states of the sample value.

For audio information such as sound waves, it is commonly accepted that the digitization process discretizes a continuous phenomena both in the time domain and in the signal level domain. As such, the process of digitization itself introduces a fundamental error source, in that it cannot record detail smaller than the discretization interval in either domain. The industry has referred to this, among other ways, as "aliasing" in the time domain, and "quantization noise" in the signal level domain. Thus, there will always be a basic error floor of a digital signal. Pure quantization noise, measured in a root mean square sense, is theoretically known to have the value of one over